

REMARKS

This is in response to the Office Actions dated August 31, 2006, May 31, 2006, and February 9, 2006. Claims 1-10 and 19-22 are pending. An RCE has been filed herewith.

Section 112 & Formality Issues

Claim 2 stands objected to for allegedly lacking antecedent basis. The change to claim 2 herein addresses and overcomes any potential issue in this regard.

Claims 5-6 stand rejected under 35 U.S.C. Section 112, second paragraph. The changes to claims 5-6 herein address and overcome any potential issue in this regard. Claims 5-6 have been amended to clarify that a “non-contact through electrode” is one that is not electrically connected to an electrode pad of the semiconductor chip in which the non-contact through electrode is formed (it may ultimately be connected to another pad somewhere else in the device). For example and without limitation, Fig. 1 of the instant application illustrates non-contact through electrode 12(1); and insulating film 9 in Fig. 1 prevents the electrode 12(1) from being connected to a pad 2 in which the non-contact through electrode is formed. See also pg. 19, lines 12-16; and pg. 20, lines 8-14.

Claim 1 - Art Rejection

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Tsunashima in view of Yu. Applicant notes that “Yu” appears to be 6,028,367 – not the 6,518,669 mentioned on page 3 of the Office Action dated February 9, 2006. The Office Action contends that Tsunashima discloses all features of claim 1 except for “multiple through electrodes formed in a region within the electrode pads.” To account for this alleged deficiency in Tsunashima, the Office Action cites to plugs 28 of Yu, and contends that plugs 28 are formed

within metal pads 22, 26. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

First, claim 1 requires that “at least two of the through electrodes formed in a region within the same electrode pad are not in direct electrical contact with each other.” Both Tsunashima and Yu fail to disclose or suggest this feature of claim 1. In Yu, the plurality of metal via plugs are connected to the same bond pads and thus are in direct electrical contact, thereby teaching away from amended claim 1. Thus, even the alleged combination (which would be incorrect in any event) fails to meet the claim in this respect.

Second, claim 1 requires “chip-stack semiconductor device, comprising: multiple semiconductor chips vertically stacked on top of each other, wherein: each of the semiconductor chips includes electrode pads, and *multiple through electrodes formed in a region within the electrode pads.*” The cited art fails to disclose or suggest the invention of claim 1 in this respect. The Office Action relies on Yu for this alleged feature. However, with respect to claim 1, referring to Fig. 2 of Yu it is clear that the plugs 28 are *not* formed “*within*” the metal pads 22, 26. It is well known that the word “within” means “in or into the interior” (e.g., see Merriam-Webster dictionary). Yu (and thus the alleged Section 103(a) combination) fails to disclose or suggest this feature. Instead, plugs 28 in Yu are formed on (on top or below) the metal pads 22, 26 – *not “within”* pads as called for in claim 1. Yu from col. 5, line 69 to col. 6, line 9 indicates that a plurality of metal via plugs are deposited on top of the first metal pad 26, and that the second metal pad 24 is then also deposited on top of the via plugs 28, thereby making clear that plugs 28 in Yu are formed on (on top or below) the metal pads 22, 26 – *not “within”* pads as called for in claim 1. Thus, it will be appreciated that in Yu, plugs 28 are not formed in a region

“within” the electrode pads as required by claim 1. Thus, even the alleged combination (which applicant believes would be incorrect in any event) fails to meet the invention of claim 1.

Additionally, there are no through electrodes extending through pads 7 in Tsunashima. Thus, Tsunashima teaches directly away from the invention of claim 1 because the reference does not even use through-electrodes which extend through and within pads 7. Tsunashima does not disclose or suggest any through electrode extending through any pad 7, let alone multiple through electrodes extending through a given pad as required by claim 1. Citation to Yu cannot overcome the flaws of Tsunashima. Because Tsunashima does not have any through electrodes extending through pads 7, there is no reason why one of ordinary skill in the art would have ever modified Tsunashima to have such through electrodes – there is simply no reason or suggestion in the art for doing so. In particular, there is nothing below pads 7 in Tsunashima that requires electrical connection. Furthermore, there is nothing in Yu which suggests modifying Tsunashima in such a manner. The Section 103(a) rejection is flawed for this additional reason.

Claim 20

First, claim 20 requires that “at least two of the through electrodes formed in a region within the same electrode pad are not in direct electrical contact with each other.” Both Tsunashima and Yu fail to disclose or suggest this feature of claim 20. In Yu, the plurality of metal via plugs are connected to the same bond pads and thus are in direct electrical contact, thereby teaching away from amended claim 20. Thus, even the alleged combination (which would be incorrect in any event) fails to meet the claim in this respect.

Second, claim 20 requires that “a plurality of different through electrodes are provided in the first electrode pad, so that when viewed from above the plurality of through electrodes are located inside a periphery of the first electrode pad.” The cited art fails to disclose or suggest

this feature either taken alone or in combination. It is clear that even the plugs 28 of Yu are not provided *in* a first electrode pad (instead, they are on top of pad 26). Thus, even the alleged combination (which applicant believes would be incorrect in any event) fails to meet the invention of claim 20.

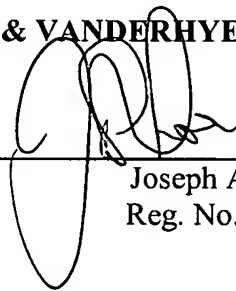
Conclusion

It is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____



Joseph A. Rhoa
Reg. No. 37,515

JAR:caj
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100